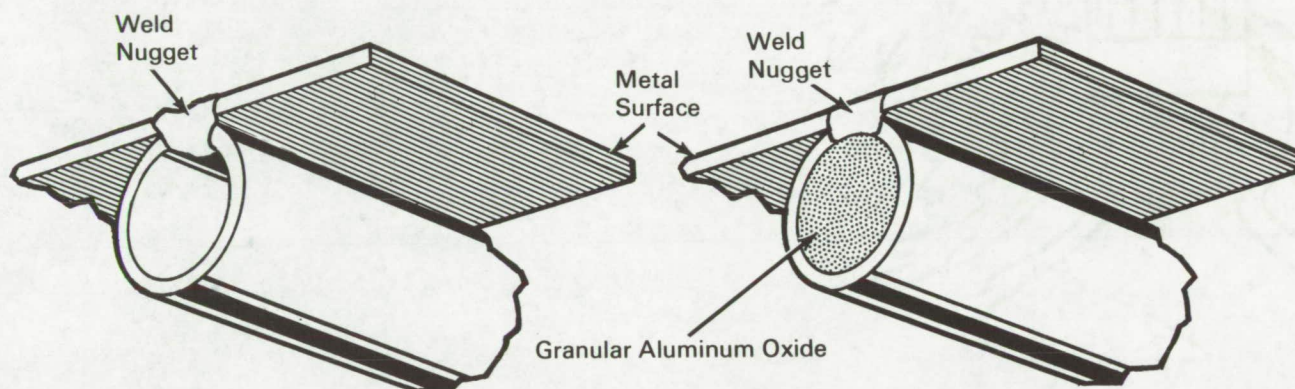


# NASA TECH BRIEF



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## Aluminum Oxide Filler Prevents Obstructions in Tubing During Welding



### The problem:

To weld serpentine tubing to flat surfaces and avoid obstructions in the tubes formed by molten weld nuggets. The usual method of preventing weld nuggets uses a rigid back-up rod inserted throughout the tube cavity. However, this technique cannot be used for serpentine tubing. Furthermore, the tube supporting device must allow generated gases to escape. If gases are trapped as the weld junction cools, a weak weld results.

### The solution:

Filling the tubing with granular aluminum oxide which has a high melting point (2050°C) and is porous enough to allow gases to escape from the welding area.

### How it's done:

The tubing is filled with a coarse (60 mesh) grain aluminum oxide and the ends of the tubing are then closed with asbestos plugs. The welding is done with tungsten inert gas or other metal-inert gas equipment.

During welding the aluminum oxide supports the molten nugget until it cools and hardens. Then the tubing is unplugged and the aluminum oxide is poured out.

### Notes:

1. The tubing used was 6061-T6 aluminum alloy, with an outside diameter of 7/16 inch and a thickness of 0.020 inch. The flat surface was 0.010 inch thick and made from the same alloy.
2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer  
Manned Spacecraft Center  
Houston, Texas, 77001  
Reference: B66-10125

### Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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Category 05